

## 2017 AWWA Water Audit Level 1 Validation

Water System Name: Valencia Water Company

Water System ID Number: 1910240

Water Audit Period: Calendar 2017

### Water Audit & Water Loss Improvement Steps:

Steps taken in preceding year to increase data validity, reduce real loss and apparent loss as informed by the annual validated water audit:

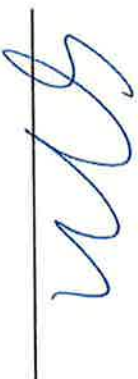
- Establish organization workgroup to review and manage water loss
- Supply meter testing and calibration
- Customer meter upgrades and replacement to AMR
- Large volume meter testing

### Certification Statement by Utility Executive:

This water loss audit report meets the requirements of California Code of Regulations Title 23, Division 2, Chapter 7 and the California Water Code Section 10608.34 and has been prepared in accordance with the method adopted by the American Water Works Association, as contained in their manual, *Water Audits and Loss Control Programs, Manual M36, Fourth Edition* and in the Free Water Audit Software version 5.

Steve Cole

Assistant General Manager



09/27/2018

Executive Name (Print)

Executive Position

Signature

Date

Utility Provided

## Water Audit Level 1 Validation Document

### Audit Information:

Utility: Valencia Water Company      PWS ID: 1910240  
System Type: Potable      Audit Period: Calendar 2017  
Utility Representation: Matt Dickens, Robert McLaughlin, Mike Avlord, Gil Hermosillo, Kathleen Wilson, Eunie Kang, Cheryl Ann, Kim Grass, Judy Lozano  
Validation Date: 9/18/2018      Call Time: 1pm      Sufficient Supporting Documents Provided: Yes

### Validation Findings & Confirmation Statement:

#### Key Audit Metrics:

Data Validity Score: 58      Data Validity Band (Level): Band III (51-70)  
IL: 1.78      Real Loss: 37.17 (gal/conn/day)      Apparent Loss: 6.58 (gal/conn/day)  
Non-revenue water as percent of cost of operating system: 4.9%

#### Certification Statement by Validator:

This water loss audit report has been Level 1 validated per the requirements of California Code of Regulations Title 23, Division 2, Chapter 7 and the California Water Code Section 10608.34.

All recommendations on volume derivation and Data Validity Grades were incorporated into the water audit. ☒

### Validator Information:

Water Audit Validator: Will Jernigan, P.E.      Validator Qualifications: Contractor for CA-NV AWWA Water Loss TAP

Validator Provided

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#	AWWA Water Audit Input	Code	Final DVG	Basis on Input Derivation	Basis on Data Validity Grade
1	Volume from Own Sources	VOS	7	Supply meter profile: Operate two groundwater sources (aquifer) with 22 active individual wells. Two wells are raw water supplies that service golf courses and have been omitted from audit (well 160-VGC, well 159). VOS input derived from: Manual reads from production meters as archived. Comments: Input derivation from supporting documents confirmed. Exclusion of non-potable volumes confirmed.	Percent of own supply metered: 100% Signal calibration frequency: None. Volumetric testing frequency: Annual. Volumetric testing method: Ultrasonic comparative tests by third party, documentation provided. Percent of own supply volumetrically tested: 95% Comments: No additional comments.
2	VOS Master Meter & Supply Error Adjustment	VOS MMSEA	3	Input derivation: Calculated as volume-weighted average from annual source meter testing. Net storage change included in MMSEA input: No. Comments: No additional comments.	Supply meter read frequency: Daily. Supply meter read method: Manual. Frequency of data review for trends & anomalies: Monthly. Storage levels monitored in real-time: Yes. Comments: No additional comments.
3	Water Imported	WI	3	Import meter profile: Imported water comes from Castaic Lake Water Agency (now Regional) with 7 active metered connections. Each connection, with the exception of two, has both a Regional meter and a VWC meter. Regional meters are used to derive the WI volume. Comments: Input derivation from supporting documents confirmed. Exclusion of non-potable volumes confirmed.	Percent of import supply metered: 100% Signal calibration frequency: Has been done but not in last 5 years. Standard is to test once every 10 years, with last test occurring in 2009. Volumetric testing frequency: Has been done but not in last 5 years. Standard is to test once every 10 years, with last test occurring in 2009. Volumetric testing method: Unknown. Percent of import supply volumetrically tested: 100% Comments: No additional comments.
4	WI Master Meter & Supply Error Adjustment	WI MMSEA	3	Input derivation: Left blank in absence of available test data. Comments: No additional comments.	Import meter read frequency: Daily. Manual reads are collected by VWC staff. Import meter read method: Manual and automatic logging. Regional staff reads their meters monthly, and automatically logs information. Frequency of data review for trends & anomalies: Monthly. Comments: No additional comments.
5	Water Exported	WE	5	Export meter profile: Operate one metered emergency interconnection with Santa Clarita Water District. Comments: Input derivation from supporting documents confirmed. Exclusion of non-potable volumes confirmed. Exclusion from BMAC input confirmed.	Percent of export supply metered: 100% Signal calibration frequency: None. Volumetric testing frequency: Within last 5 years but less than annually. Volumetric testing method: Comparative tests. Percent of export supply volumetrically tested: 100% Comments: No additional comments.

#	AWWA Water Audit Input	Code	Final DVG	Basis on Input Derivation	Basis on Data Validity Grade
6	WE Master Meter & Supply Error Adjustment	WE MMSEA	3	Input derivation: Left blank in absence of available test data. Comments: No additional comments.	Export meter read frequency: As needed. Export meter read method: Manual. Frequency of data review for trends & anomalies: As needed. Comments: This meter is infrequently used.
7	Billed metered	BMAC	7	Customer meter profile: Age profile: Up to 15 year Reading system: 86% converted to AMR Read frequency: Monthly. Constant meter reading takes place. Comments: Lag-time correction is not employed in input derivation. Input derivation from supporting documents confirmed. Exclusion of non-potable volumes confirmed.	Percent of customers metered: 100% Small meter testing policy: Reactive testing plus limited sampling occurs on 10% of retired meters Number of small meters tested/year: 1,554 during 2017. Large meter testing policy: Targeted testing is conducted annually for high volume meters, based on AWWA schedule. Number of large meters tested/year: Number not quantified at time of review. Meter replacement policy: 5% of stock is replaced each year. Number of replacements/year: About 1500 to 1800 meters annually. Billing data auditing: Standard billing QC, plus review of volumes by use type each billing cycle. Financial auditor performs sampling review on select accounts each year. Comments: No additional comments.
8	Billed unmetered	BUAC	10	Profile: Includes temporary jumper connections that are in place on new homes before a meter is connected to the account. Customers are charged a flat rate. Input derivation: Extrapolation from like use data on metered connections. Comments: No additional comments.	Policy for metering exemptions: All connections require metering but a few unmetered connections remain. Comments: No additional comments.
9	Unbilled metered	UMAC	10	Profile: This includes two VWC accounts – facility use and drinking fountain. Input derivation: Direct from meter readings. Comments: Input derivation from supporting documents confirmed.	Policy for billing exemptions: Own facilities plus other exemptions including a drinking fountain. Comments: No additional comments.
10	Unbilled unmetered	UUAC	5	Profile: Operational flushing and fire department usage. Comments: Flushing activities greatly scaled back due to drought. Custom California default of 0.25%WS utilized.	Comments: Default grade applied.
11	Unauthorized consumption	UC	5	Comments: Default input applied.	Comments: Default grade applied.
12	Customer metering inaccuracies	CMI	3	See BMAC comments regarding meter testing & replacement activities. Input derivation: Rudimentary estimate.	Characterization of meter testing: Limited (upon request AND consumption flag only). Characterization of meter replacement: Ongoing (proactive), annual. 5% of customer meter stock is replaced annually.

#	AWWA Water Audit Input	Code	Final DVG	Basis on Input Derivation	Basis on Data Validity Grade
				Comments: Given availability of small and large meter test results, recommended to analyze for data-derived input for next audit, using volume-weighting.	Comments: No additional comments.
13	Systematic data handling errors	SDHE	5	Comments: Default input applied.  Input derivation: Totaled from GIS based map. Hydrant leads included: No. Comments: No additional comments.	Comments: Default grade applied.  Mapping format: Digital. Asset management database: In place and integrated with GIS system. Map updates & field validation: Accomplished through normal work order processes. Field staff uses tools to validate inaccuracies in real time. Comments: No additional comments.
14	Length of mains	Lm	10		
15	Number of service connections	Ns	10	Input derivation: Standard report run from billing system. Basis for database query: Location or other premise-based ID. Comments: No additional comments.	CIS updates & field validation: Accomplished through normal meter reading processes. Is not regularly checked against GIS totals. Estimated error of total count within: 1%. Comments: No additional comments.
16	Ave length of cust. service line	Lp	10	Comments: Default input and grade applied, as customer meters are typically located at the property boundary given California climate.	
17	Average operating pressure	AOP	7	Number of zones, general profile: Operate 5 main zones with multiple subzones. Typical pressure range: 40PSI to 175PSI Input derivation: Field personnel input pressure data into GIS software. This logging effort occurs when teams are out in the field. Comments: No additional comments.	Extent of static pressure data collection: Not collected currently. Characterization of real-time pressure data collection: Well-covered - telemetry or pressure logging beyond the boundary points, targeted in some portions of the system but not representative of the whole. Hydraulic model: None currently in place. Comments: Pressure information is captured in SCADA.
18	Total annual operating cost	TAOC	10	Input derivation: From official financial reports. Comments: Confirmed costs limited to water only, and water debt service included.	Frequency of internal auditing: Less than annually, at least every three years. Frequency of third-party CPA auditing: Annually. Comments: No additional comments.
19	Customer retail unit cost	CRUC	9	Input derivation: General Metered Service per CCF used as proxy for single volumetric rate, given recent change to simple rate structure with single rate. Sewer charges are not based on water meter readings. Sewer revenues are not applicable. Comments: No additional comments.	Characterization of calculation: Weighted average composite of all rates. Input calculations have not been reviewed by an M36 water loss expert. Comments: No additional comments.

#	AWWA Water Audit Input	Code	Final DVG	Basis on Input Derivation	Basis on Data Validity Grade
20	Variable production cost	VPC	5	Supply profile: Own sources and import supply. Primary costs included: Treatment chemicals, supply & distribution power, and purchase costs. Secondary costs included: None currently included. Comments: No additional comments.	Characterization of calculation: Primary costs only. Input calculations have been reviewed by an M36 water loss expert. Comments: No additional comments.



## Key Audit Metrics

(~)	VALIDITY	Data Validity Score: 58	Data Validity Band (level): Band III (51-70)
(#)	VOLUME	IL: 1.78	Real Loss: 37.17 (gal/conn/day)
(\$)	VALUE	Annual Cost of Apparent Losses: \$181,160	Apparent Loss: 6.58 (gal/conn/day)
			Annual Cost of Real Losses: \$1,056,109

## Infrastructure & Water Loss Management Practices:

Infrastructure age profile: Generally 10 – 15 years in age. System operations began in 1955, but has grown rapidly since early 2000s.

Infrastructure replacement policy (current, historic): infrastructure installation has been sparked by area growth, but no replacement projects are currently underway.

Estimated main failures/year: 2 large breaks

Estimated service failures/year: around 50

Extent of proactive leakage management: 2015 leak detection project took place on the older portion of the system – roughly 10% of the system.

Other water loss management comments: No additional comments.

## Comments on Audit Metrics & Validity Improvements

The Infrastructure Leakage Index (ILI) of 1.78 describes a system that experiences leakage at 1.78 times the modeled technical minimum for its system characteristics. The Data Validity Score falling within Band III (51-70) suggests that next steps may be focused simultaneously on improving data reliability and evaluating cost-effective interventions for water & revenue loss recovery. Opportunities to improve the reliability of audit inputs and outputs include:

- Improved understanding of Import Master Meter Error: consider adopting or increasing the rigor of a source meter volumetric testing and calibration program, informed by the guidance provided in AWWA Manual M36 – Appendix A.
- Temporal alignment of Billed Metered Authorized Consumption with Water Supplied: consider pro-rating the first and last months of the audit period to better align consumption with actual dates of use, and using read date as basis for reporting.
- Improved estimation of CMI: consider a customer meter testing program which tests a sample of random meters whose stratification (by size, age, or other characteristics) represents the entire customer meter stock.

## Further Recommendations

Since Data Validity Score is >50, consider follow-on implementations as described in the AWWA M36 Manual (see following page), once the annual water audit is established:

- Conduct Uncertainty Analysis to determine Margins of Error on Water Balance components
- Conduct Advanced Validation as warranted by Margins of Error
- Conduct a Real Loss Component Analysis to develop your leakage profile.
- Conduct an Apparent Loss Component Analysis to develop your apparent loss profile.
- Cost-benefit analysis & target setting for water loss components.
- Design & implement water loss control program for cost-effective interventions



# M36 - The Big Picture: Economic Intervention

